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XXXVIII.—*The* Victorella pavida *of Saville Kent.*

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[Plate XII. figs. 1–3.]

Having recently been so fortunate as to meet with a considerable supply of this beautiful and interesting polyzoon, I propose in the following notes to give a description of it, with special reference to the observations of the naturalist who first found it and described it at some length in the 'Quarterly Journal of Microscopical Science' (N. S. vol. x. p. 34, with pl. iv.). As my own observations differ in one or two essential points from Mr. Kent's, I append the systematic description which he formulated:—

"Family **Homodiætidæ.**

"*Victorella pavida.*

"Polypidom minute, confervoid, adherent or semierect, irregularly branched. Tentacles eight in number; no gizzard. Inhabiting brackish water. Parasitic on the polypary of *Cordylophora lacustris.*"

Mr. Hincks, in his 'Marine Polyzoa,' describes the *Victorella*, but with important differences from the statements of Mr. Kent, and, in fact, by combining the two accounts it is possible to arrive at conclusions somewhat approaching the truth. Mr. Hincks, however, had not, I believe, the opportunity

of examining fresh specimens, and his description is but a portion of what has to be said regarding *Victorella*.

I first met with the polyzoon in question last spring, at which time the zooids were solitary, and semi-repent, colourless, and in shape much like a violin with a straight elongated neck. Not being aware of the observations of Messrs. Kent and Hincks, I communicated particulars and sketches to one or two gentlemen who had special knowledge of the subject; and Mr. Pennington, of Bolton, first suggested the identity of my find with *Victorella*, though its solitary condition and the remarkable anatomical divergences from published descriptions rendered the identification somewhat doubtful.

I failed to find any further specimens until September, when I came into possession of a considerable quantity, and the results of my examination will be embodied in the following notes.

The polypidom consists of a series of slender yellow or brownish tubes, on which at intervals are situated swellings (fig. 1, *a*, *b*, *c*), in each of which a zooid is developed in the ordinary way from an enlargement of the *funiculus* (fig. 1, *d*) or continuous protoplasmic cord which runs through the whole of the tubes of which the colony is composed. From each swelling arise two branches at right angles (fig. 1), and by the growth of these branches and the development of zoœcia, from which again other branches arise, the growth of the colony continues, always branching in a rectangular direction, so that a matted mass results. The zooids developed at the nodal points vary widely in dimensions; I have examined some which have reached $\frac{1}{10}$ in. in height, whilst others were not more than $\frac{1}{40}$ in. At the terminations of the branches are to be found, as a rule, the largest specimens, and in the case of these individuals the cell is of much more uniform diameter than in the smaller ones, so that the whole animal is contained within it even when retracted.

Taking one of these larger specimens as a type, the following appearances present themselves.

The tentacles, eight in number, are arranged around the mouth of the animal. They are hollow (fig. 2, *g*), and of almost the same diameter throughout, with the usual row of cilia on either side. These cilia, however, do not form a continuous series, but fringe only the adjacent sides of the tentacles, their place being taken at the apex by a tuft of stiff but very slender setæ (fig. 3, *h*) which are devoid of movement. These setæ extend in a linear series down the outer side of the tentacles, and specially long ones are also found around the ring formed by the fusion of the bases of the latter.

The tentacular crown rests upon the upper part of the pharynx (fig. 2, *a*, *b*, fig. 3, *a*). This is a pyramidal sac with thick walls, formed of radiating prismatic fibres, by which it is rendered capable of great and very rapid dilatation. The upper margin is thinned out to form the circular lip (fig. 2, *b*), which contains a sphincter muscle, and just below a deep constriction runs round the outer wall (fig. 2, *c*). This constriction, into which the cavities of the tentacles open, is in free communication with the perivisceral space below, and this is the only trace of a vascular system which I have been able to discover. When contracted the whole of the cavity within the pharynx, except a small triangular ciliated space within the mouth, is obliterated, and three radiating folds take its place. At its termination the pharynx communicates with the gizzard (fig. 3, *b*), a slight sphincter-like ring marking the separation. The possession of a gizzard is denied to *Victorella* by Mr. Kent, but its existence is not difficult to make out with a power of 200 diameters, whilst it is very easy with anything approaching 400. The point is, moreover, put beyond dispute by some instantaneous photographs which I have succeeded in taking with an exposure of $\frac{1}{4}$ second or thereabouts to magnesium light*.

In these photographs the double sphincter, the upper part belonging to the gizzard and the lower to the stomach, is most clearly shown (fig. 3, *c*).

The gizzard is simply a thin-walled sac, without cilia, but faintly striated transversely, and showing under a high power traces of the same honeycomb arrangement as that presented by the bases of the prismatic fibres of the pharynx. It is separated from the stomach by the sphincters just referred to, and between the two a slight groove exists, marking clearly the point of separation.

The stomach (fig. 3, *d*) is a long thick-walled tube, the lower part of which is of a deep yellowish-brown colour, the walls showing numerous granules and small oil-globules. The lower portion of the stomach is continuous by its outer wall with the funiculus (fig. 3, *i*), which is colourless, and

* These photographs were taken on the Autotype Company's Challenge plates, with a camera extended to 8 feet, in order to obtain depth by the use of a low power. In conjunction with my cousin, Mr. E. Shepherd, I am making a series of experiments in this direction, and the results so far obtained hold out great promise of future success. I look forward chiefly to being able to obtain accurate outlines of the principal features, which may, if necessary, be worked up by hand, so as to get rid of the inexactitude which, to some extent, must always affect the most finished drawings made by hand and eye alone from living and moving objects.

passes down to end in an enlargement attached to the wall of the tube, which is continuous below with the remainder of the general cord.

The intestine (fig. 3, *e*) arises from the stomach at a point opposite to the entrance or cardiac orifice. At the point where it commences there is within the stomach a semilunar valve-like flap on the gastric wall, and this, which forms a pylorus, is ciliated, unlike any other portion of the stomach. At this point a pellet of food may be seen to be constantly whirling round in a manner strongly suggestive of the action of the pellet-forming organ of *Melicerta ringens*.

The walls of the intestine are thin, and its upper portion is surrounded by a mass of granular protoplasmic material. The anus is not, as generally stated, situated immediately below the tentacles. The intestine terminates halfway between this point and the stomach (fig. 3, *f*), and for the remainder of the distance a hollow muscular tube passes upward, and ends at the spot usually assigned to the anal orifice (fig. 3, *g*).

The process of defæcation is accomplished as follows:—The current caused by the reversed peristaltic action of the stomach drives the flap before spoken of against the cardiac orifice, thus preventing regurgitation, and the pyloric orifice opening, the matter about to be rejected is propelled into the intestine, the pyloric sphincter closing the opening behind it. The intestine is then drawn up by the muscular tube attached round the anus, until this last is beyond the membrane which closes the cell, and the intestine thereupon, and only thereupon, contracts and expels its contents. The anus then sinks down to its normal position, until the time arrives for a repetition of the process. This arrangement is so remarkable that I am glad to be corroborated by the authority of one so competent as Prof. Allman, who writes:—"Your remark regarding the termination of the intestinal tube and its action in the expulsion of the ejectamenta is interesting, and now that you have called my attention to it, I think I have noticed the same phenomenon in other species."

The whole of the organs are invested by a delicate membrane, which is continued upwards to a point just beyond the commencement of the tentacles (fig. 2, *e*), whence it is reflected on to the inner surface of the tube of the animal. The tube is composed of a transparent homogeneous substance, the lower portion being rigid and the upper flexible. The rigid portion is strengthened at intervals by transverse bars of a transparent material, free at either end. The flexible portion is dilated near its centre, and contracts again slightly

towards the point where it joins the operculum (fig. 3, *k*). This is a tube composed of a very delicate membrane, developed independently in a mass of protoplasm at the upper part of the embryonic cell. It is generally described as composed of setæ, around which the membrane is stretched; but, whilst I am not prepared to contradict the statements of such authorities as Professor Allman and Mr. Pennington, not to mention other writers on the subject, I am convinced, after most careful observation directed to this special point, that nothing of the sort exists in *Victorella*, nor can I find any trace of setæ with the highest power which I have found it possible to use, about 500 diameters. When seen from above the appearance is that of a circular opening, with zigzag margin, no trace of thickening or unevenness being anywhere visible. I have also examined specimens of *Bowerbankia imbricata* and of *Cylindrœcium* without being able to trace the setæ either with direct or dark-ground illumination, though the very delicate setæ on the tentacles were plainly apparent. There are no muscles attached to the operculum; but the flexible portion of the tube below it is retracted by a powerful muscle, whose fibres are striated, and which is attached below to the rigid portion of the tube. There is also a muscle by means of which the alimentary canal is retracted, and to the base of each tentacle is attached a narrow band of striated fibre (fig. 2, *d*), by which, in concert with its fellows, the tentacular ring is withdrawn, and the action of one or more is able to draw the crown to one side or the other. There are also small muscles by means of which the animal is able to rotate upon its axis. For the sake of clearness these muscles are omitted in the drawing.

In some cases a small projection may be seen upon the side of the tube near its centre. This is the germ of a future zooid, so that, in addition to the growth by enlargements arising in the course of the stolon, each terminal zooid at least may give origin to another colony, for the zooid thus developed forms a stolon in the usual way. It should have been stated, in speaking of the general stolon, that beyond each zoœcium there exists a septum in the course of the stolon, through which the funiculus runs, having on either side of the septum a conical enlargement, the bases of the two being in contact.

The nodal zooids are, as has been stated, generally much smaller than the terminal and devoid of colour; the tentacles and stomach are also, as a rule, much less developed. Anatomically, however, there is no difference between them.

The interest attaching to this polyzoon no doubt centres in

the fact that we have here a form intimately allied to, if not identical with, some marine forms, and differing widely from the freshwater types, but which yet with its host appears to find itself perfectly at home in fresh water. Mr. Shepherd has, since seeing my specimens, found it in the Regent's Canal at Maida Vale; and I have found it in the Surrey Canal, unaccompanied by any other marine type, or even one found largely in brackish water, except *Pleurosigma*.

The small number of tentacles, their setigerous character, the complete extrusion of the polypide, the absence of epistome, and the striated muscular fibres are distinctly different from the freshwater type, and are constant characteristics of the marine type. Much remains to be done before the conditions under which this and similar transfers of marine forms to freshwater habitats are understood.

It will be seen that my observations differ from Mr. Kent's as to the character of the polypidom of *Victorella*, the presence of the gizzard, and the nature of the operculum, while, probably from not using sufficient magnification, he did not make out the setæ upon the tentacles and apparently did not see the typical form of *Victorella* at all.

In conclusion, I have to acknowledge much kindness received from Prof. Allman and Mr. Pennington (whose work on the British Polyzoa is, I believe, about to appear). The latter gentleman relegates *Victorella* to the family Cylindrœciidæ, and has kindly drawn up the following diagnosis:—

Genus Victorella.

Characters as *Cylindrœcium*, but polypides transparent and having a gizzard. Tentacles eight.

Victorella pavida, S. Kent.

Stem repent, slender, orange-coloured during life, transparent after death; clavate enlargements wide apart. Zoœcia with upper portion erect, cylindrical, transparent, slender. Below adherent and dilated, forming part of the stolonic expansions.

Hab. Brackish and fresh water, on *Cordylophora lacustris*, whose migrations it follows.

EXPLANATION OF PLATE XII. Figs. 1–3.

Fig. 1. Portion of stolon at growing end, showing the lateral branches and young zooids. *a*, zooid extended; *b*, zooid developing; *c*, embryonic zooid at end of branch; *d*, funiculus.

Fig. 2. Optical longitudinal section through tentacular ring and adjacent parts. *a*, wall of pharynx; *b*, thinned margin of same, reflected to enclose *c*, circular sinus, which is continued into *g*, canal of tentacle; *d*, striated retractor muscle of tentacle; *e*, perivisceral membrane, reflected over base of tentacle; *f*, operculum.

Fig. 3. A fully-developed but asexual zooid. *a*, cavity of pharynx; *b*, gizzard; *c*, sphincters of gizzard and stomach; *d*, stomach; *e*, intestine; *f*, termination of intestine (*i. e.* anus); *g*, termination of muscular tube attached round anus; *h*, tufts of setæ crowning tentacles; *i*, funiculus; *k*, operculum.

XXXIX.—*Diagnoses of the new Species of* Galatheidea *collected during the 'Challenger' Expedition.* By J. R. Henderson, M.B., F.L.S.

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The present paper contains brief notices of the new species of Galatheidea obtained during the cruise of H.M.S. 'Challenger.' As some time has elapsed since the return of the expedition in 1876, a number of the species then new to science have been retaken and described elsewhere. This is especially the case as regards the group treated of, and four deep-water genera well represented in the collection, viz. *Galacantha*, *Elasmonotus*, *Diptychus*, and *Ptychogaster*, come under this category. I am indebted to the courtesy of M. Alphonse Milne-Edwards for the opportunity of examining his types from the 'Blake' and the recent French expeditions.

Galathea, Fabr.

Galathea pusilla, n. sp.

Rostrum triangular, nearly twice the length of the ocular peduncles, with a prominent tooth on either side of the base, and a minute one towards the apex (the latter is occasionally absent). Carapace smooth and glabrous, the striæ not numerous, the lateral borders each with seven or eight spines; gastric region with two small spines on either side of the median line. Chelipedes long and slender, the meral, carpal, and propodal joints each with three rows of spinules; fingers parallel and finely toothed. Ambulatory limbs slender and compressed, with a few spinules especially on the meral joints.

Length of body (in a ♂) 10 millim.; length of chelipedes 11 millim.